ORDER NO. AD9703047C8

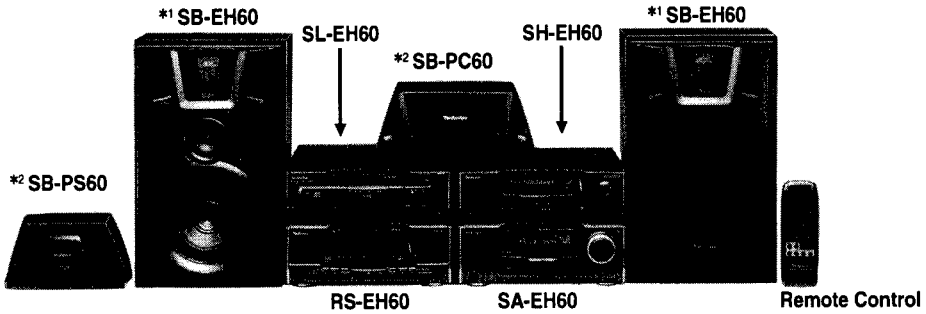
Service Manual

Sound Processor

Sound Processor

SH-EH60

System: SC-EH60



Remote Control Transmitter

Colour
(K) ..... Black

Area
(E)/(EP) ... Europe, Russia
(GC) ..... Asia, Latin America, Middle East, Africa and Oceania.

Because of unique interconnecting cables, when a component requires service, send or bring in the entire system.

DOLBY SURROUND PRO • LOGIC

Specifications

EQ/SFP Section

MANUAL GEQ:
Center frequency; 100 Hz, 315 Hz, 1 kHz, 3.15 kHz, 10 kHz
Level control; ± 3, 6, 9 dB
EQ SPACE mode
3 modes; HALL, CLEAR, HEAVY
Acoustic Image Selector: 36 pattern

Pre-amplifier Section

Input sensitivity/impedance:
VCR; 250 mV/15 kohm
VDP; 250 mV/15 kohm
Output level:
VCR RECOUT; 150 mV/1.5 kohm

DOLBY PRO LOGIC Section

PRO LOGIC mode: SURROUND, 3 STEREO
CENTER mode: NORMAL, WIDE, PHANTOM
DELAY TIME: 20 ms (Fixed)

Spectrum analizer Section

Display mode: NORMAL, PEAKHOLD, AUROLA

General

Dimensions: 287 (W)/89 (H)/273.5 (D) mm
Weight: 1.1 kg

Note: Specifications are subject to change without notice. Weight and dimensions are approximate.

System/SC-EH60:
Sound processor: SH-EH60, Tuner/Amplifier: SA-EH60, Compact disc changer: SL-EH60, Cassette deck: RS-EH60,
Front speakers: *1 SB-EH60, Center speaker: *2 SB-PC60, Surround speakers: *2 SB-PS60

Notes: *1 ...For (E)/(EP) area : Made in PAES For (GC) area : Made in MESA
*2 ...Made in MESA

⚠WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Technics®

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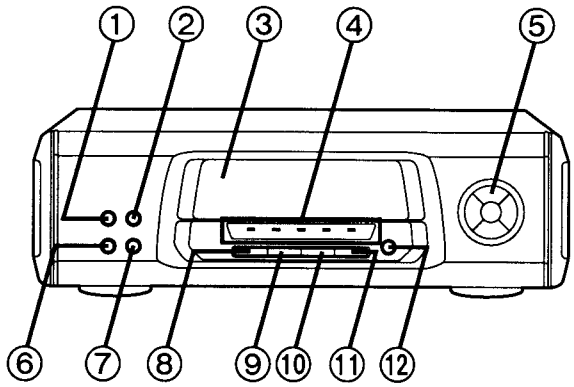
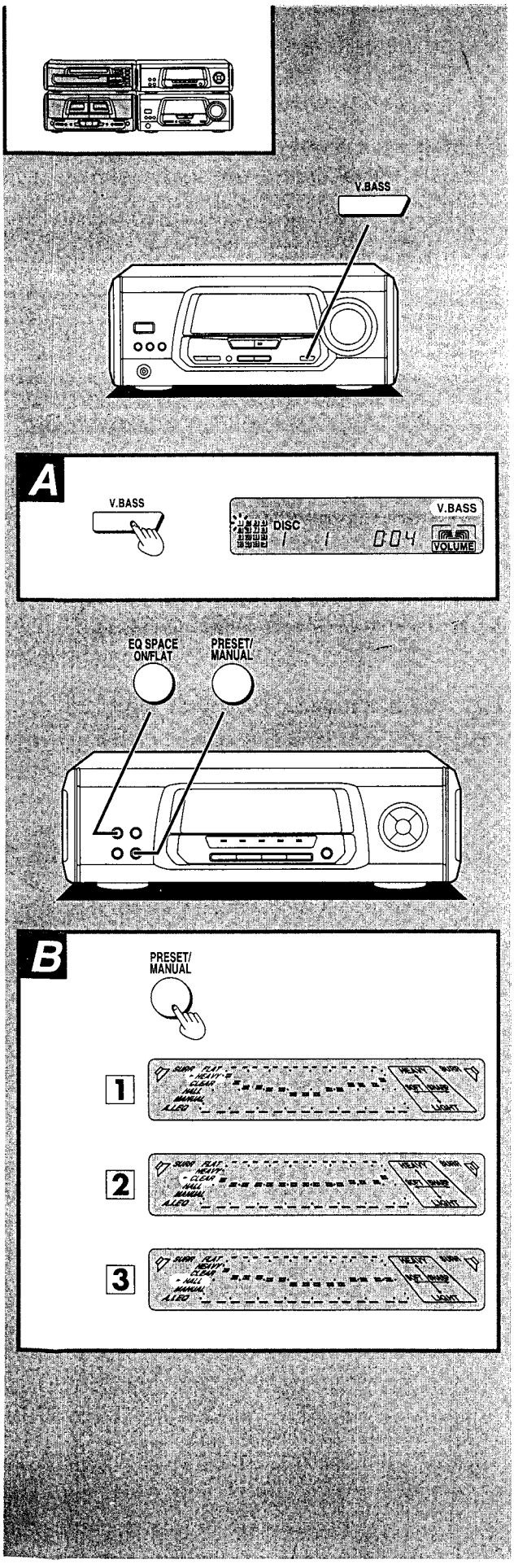
NOTE:
Refer to the service manual for Model No. SA-EH60 (ORDER No. AD9703048C8) for information on "Accessories", "Connections", "Installation" and "Packaging".

■ Location of Controls



① EQ SPACE on/flat button (EQ SPACE ON/FLAT)
② Display mode select/demonstration button (DISP MODE/-DEMO)
③ Display
④ DOLBY PRO LOGIC indicators (SURROUND, 3 STEREO, NORMAL, WIDE, PHANTOM)
⑤ Multi control buttons (MULTI CONTROL, ▶ , ▲ , ◀ , ▼)
⑥ Acoustic image EQ button (ACOUSTIC IMAGE EQ)
⑦ EQ SPACE preset/manual select button (PRESET/MANUAL)
⑧ DOLBY PRO LOGIC on/off button (DOLBY PRO LOGIC, OFF/ON)
⑨ DOLBY PRO LOGIC mode select button (MODE)
⑩ DOLBY PRO LOGIC test signal button (TEST)
⑪ DOLBY PRO LOGIC center mode button (CENTER MODE)
⑫ 3D PRESENCE select button

■ Changing the Tone



To listen with augmented bass (V. BASS) A

Press V. BASS.
To cancel, press V. BASS once again.

Note
You cannot record with the V. BASS effect.
"V. BASS" is only effective on sounds which can be heard through the speakers or headphones.

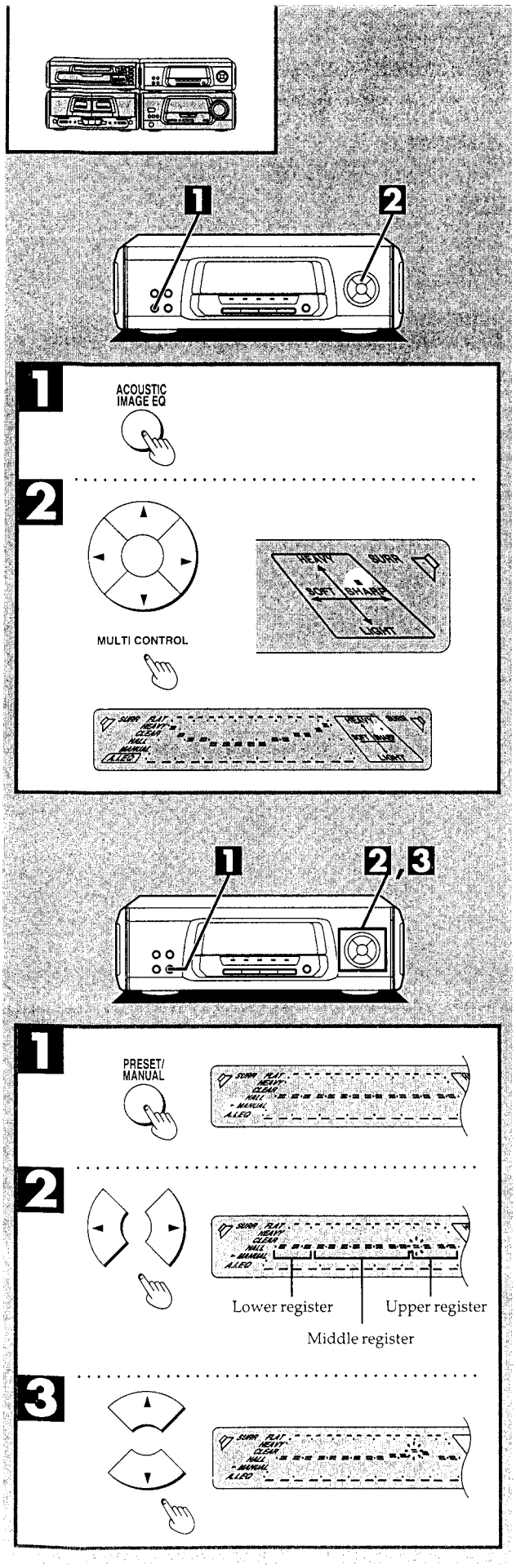
Using the internal sound quality B

Press PRESET/MANUAL to select the desired mode.
Each time you press PRESET/MANUAL, EQ and SPACE modes will be switched as follows.
HEAVY→CLEAR→HALL→MANUAL

1 **HEAVY:** Use to add "punch" to rock and other music.
2 **CLEAR:** Use to clarify the treble range of jazz, etc.
3 **HALL:** Use to impart a deep bass and spread which will make you feel as if you were in a large concert hall.
4 **MANUAL:** Refer to the "Finer sound quality changes" section on page 29.

To cancel the EQ SPACE effect
Press EQ SPACE ON/FLAT to select "FLAT".

Notes
- Recordings cannot be made in the HALL, CLEAR, HEAVY or MANUAL modes.
- Recording during use of sound quality operation will cause the "HALL", "CLEAR", "HEAVY" and "MANUAL" indicators to disappear and light again when recording is completed.



Using the acoustic image EQ

This function allows easy creation of sounds closer to what you imagine.
The figure shows an example where the sound quality has been adjusted to HEAVY level 2 and SHARP level 3.

1 Press ACOUSTIC IMAGE EQ.

2 Press the ▲ ▼ ◄ ► buttons to move the cursor to the desired music image.

HEAVY (▲): When a heavier sound is desired
LIGHT (▼): When a lighter sound is desired
SOFT (◄): When a softer sound is desired
SHARP (►): When a sharper sound is desired

To cancel the ACOUSTIC IMAGE EQ effect
Press EQ SPACE ON/FLAT to select "FLAT".

Notes
- Sounds can be made to fit a total of 36 images.
- The resulting adjustment is automatically stored in memory. When the ACOUSTIC IMAGE EQ is pressed again, the image last selected is automatically selected.

Finer sound quality changes

Finer sounds can be created by selecting MANUAL.

1 Press PRESET/MANUAL to select MANUAL.

2 Press ◄ ► to select the desired register.
◄: Upper register
►: Lower register

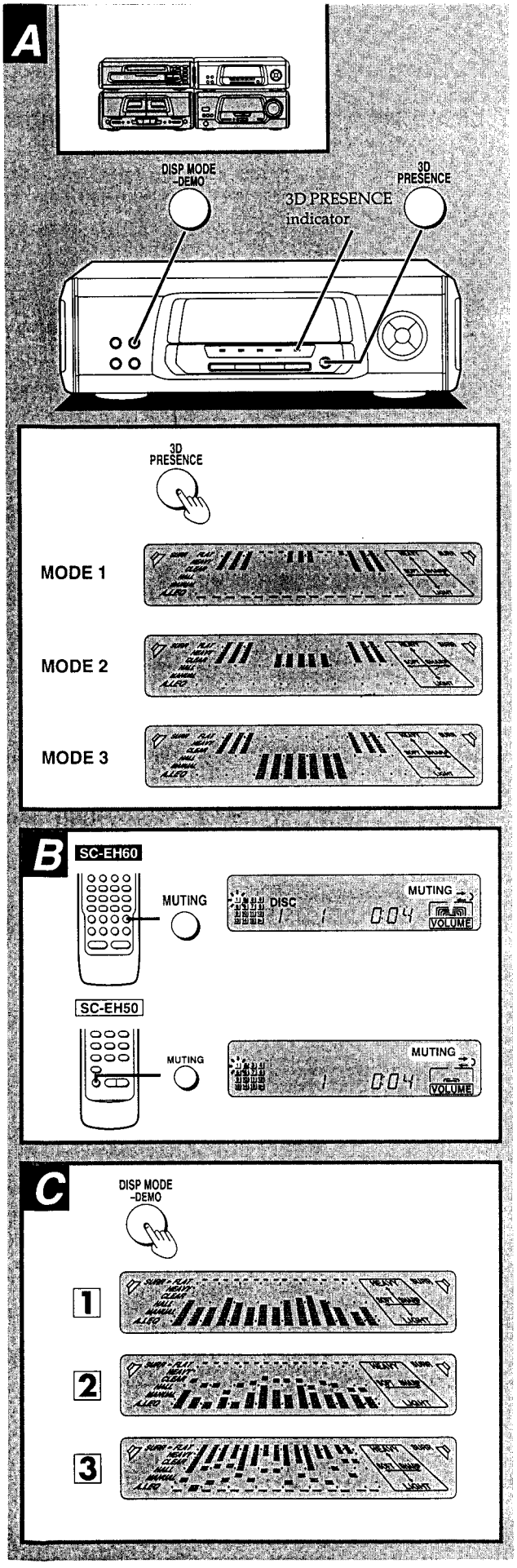
3 Press ▲ ▼ to adjust the register level.
▲: Increasing the register level
▼: Decreasing the register level

For your reference:
Upper register: includes pipes, strings, cymbals and triangles
- Increasing the upper register: mellows pipes and strings, adds precision and glitter
- Decreasing the upper register: quiets music, rids music of its "stretch"

Middle register: vocals (voice)
- Increasing the middle register: gives strength and punch to music brings voices forward, brightens sound
- Decreasing the middle register: quiets music, pulls voices back, softens intense sounds

Lower register: includes bass and drums
- Increasing the lower register: stabilizes heavy and low sounds, swells low sounds
- Decreasing the lower register: decreases noise in lower sounds, reduces muffled sounds

Notes
- The resulting adjustment is automatically stored in memory. When the MANUAL mode is selected again, the sound quality last selected is automatically played back.
- The register can be manually adjusted at 5 individual points along the 100 Hz~10 kHz frequency range.



■ Enjoying Stereophonics

This function emphasizes the center position, naturally widening the left and right, for a taste of natural stereophonic feeling regardless of listening position.

Press 3D PRESENCE. A
3D PRESENCE indicator will light.

Each time the button is pressed the display on the sound processor changes as follows.
MODE 1→MODE 2→MODE 3→OFF

To cancel, press 3D PRESENCE to select OFF.
(3D PRESENCE indicator goes out.)

Notes
- The 3D PRESENCE effect cannot be recorded.
- "3D PRESENCE" is only effective on sounds which can be heard through the speakers.
  When using the headphones, please switch off this function.

■ Convenient Functions

To mute the volume B

This feature is convenient when you have a telephone call, etc.

by remote control only

Press MUTING.
"MUTING" will light.
Sound remains muted when you put the stereo on standby.
To cancel, press MUTING once again. ("MUTING" goes out.)

To cancel from the tuner/amplifier, reduce the volume level to the minimum position (-- dB) and then reset to the desired volume.

■ Concerning the Display

The sound processor shows the level of each sound range with the three types of display described belows. C

Press DISP MODE/-DEMO momentarily.
The spectrum display will change as follows.

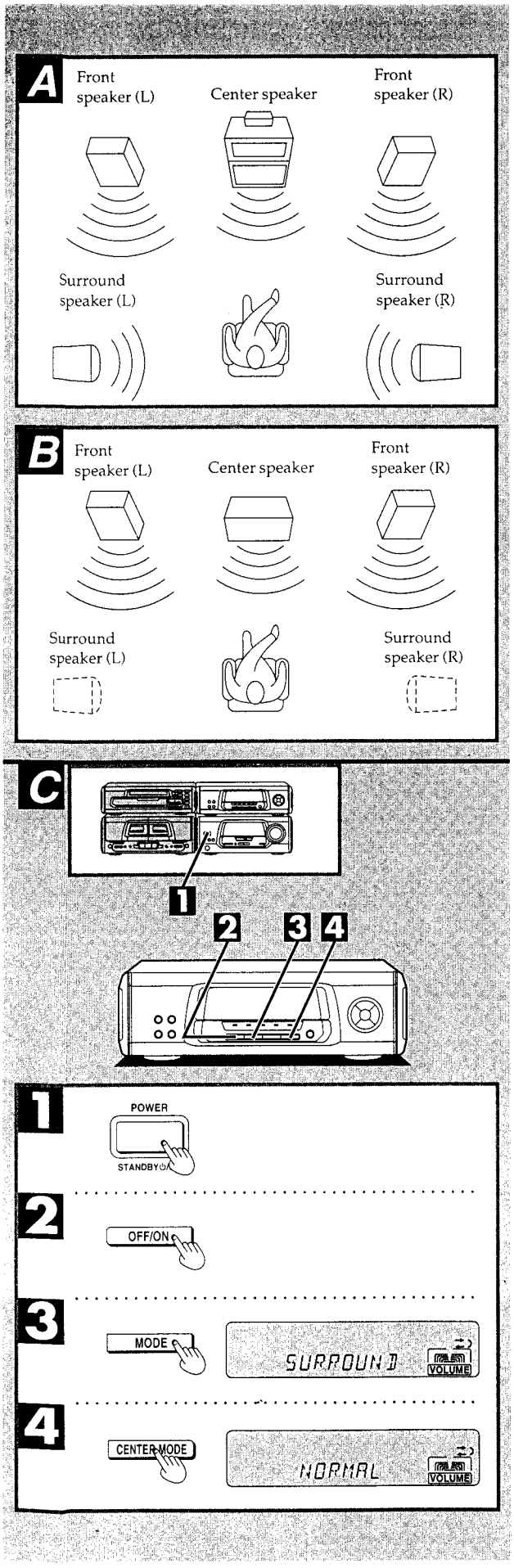
1 **Normal display**
This display indicates the strength of the sound in each tonal range.

2 **Peak-hold display**
The peak sound value of each sound range is held on the display for about one second after occurs.

3 **Aurora display**
The peak sound value of each sound range is displayed in inverted form.

For your reference:
The demonstration function starts when DISP MODE/-DEMO is held down.

■ Enjoying Sound with DOLBY PRO LOGIC



By combining front, center and surround speakers, you can enjoy the SURROUND mode which conveys a feeling of presence or the 3 STEREO mode which conveys a feeling of orientation.

SURROUND A

By reproducing the feeling of depth and movement of sound, video software or compact discs recorded with Dolby Surround provide the listener with the sensations of a movie theater.

To enjoy SURROUND, be sure to connect the surround speakers.

3 STEREO B

You can enjoy audio/video sources with clear sound, more presence and enhanced orientation. 3 STEREO can be used with sources not recorded in DOLBY SURROUND.
To enjoy 3 STEREO, be sure to connect the center speaker.

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Setting the center mode C

For Dolby Pro Logic systems, center mode setting is necessary to play back bass sounds effectively. Set the center mode in accordance with the size of your center speaker.

1 Switch on the power.

2 Press DOLBY PRO LOGIC OFF/ON to select ON.

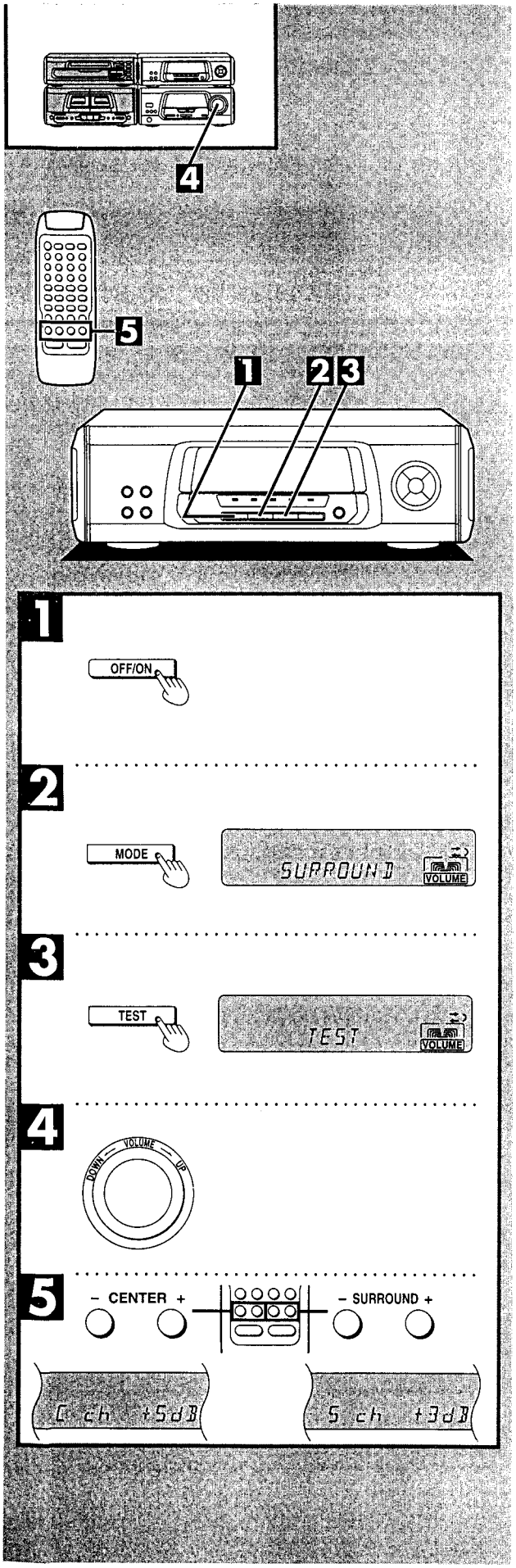
3 Press MODE to select "SURROUND" or "3 STEREO".
Each time you press the button, the display will change as follows:
SURROUND→3 STEREO
↑_____↓

4 Press CENTER MODE to select "NORMAL" mode.
Each time you press the button, the display will change as follows:
NORMAL→WIDE→PHANTOM
↑_____↓

Note
"PHANTOM" will not be displayed when you select "3 STEREO" in step 3.

NORMAL:
When the center speaker is smaller than the front speakers
WIDE:
When the center speaker is the same size or larger than the front speakers
PHANTOM: SURROUND only
When no center speaker is connected

Note
In the PHANTOM mode, the sound which would have been sent to the center speaker will be divided equally between both the left and right front speakers.



Adjusting speaker output level

In order to reproduce the movement of the sound and its clear orientation, it is important to adjust the output level of each speaker. Adjust output to the correct levels while listening to the test signal.

1 Press DOLBY PRO LOGIC OFF/ON to select ON.

2 Press MODE to select "SURROUND" or "3 STEREO".

Each time you press the button, the display will change as follows:

SURROUND→3 STEREO

3 Press TEST to output a test signal.

The test signal is emitted in the following order:

For SURROUND mode

Front speaker (left)——→Center speaker

↑ ↓

Surround speakers (left, right)←——Front speaker (right)

Note

The test signal is not emitted from the center speaker when the center mode is on PHANTOM.

For 3 STEREO mode

Front speaker (left)→Center speaker→Front speaker (right)

4 Turn VOLUME to set the volume level normally used for enjoying the source.

5 Press CENTER (–) or (+) or SURROUND (–) or (+) on the remote control to adjust the output level balance.

Adjust the output level of each speaker from the listening position until they are all identical.

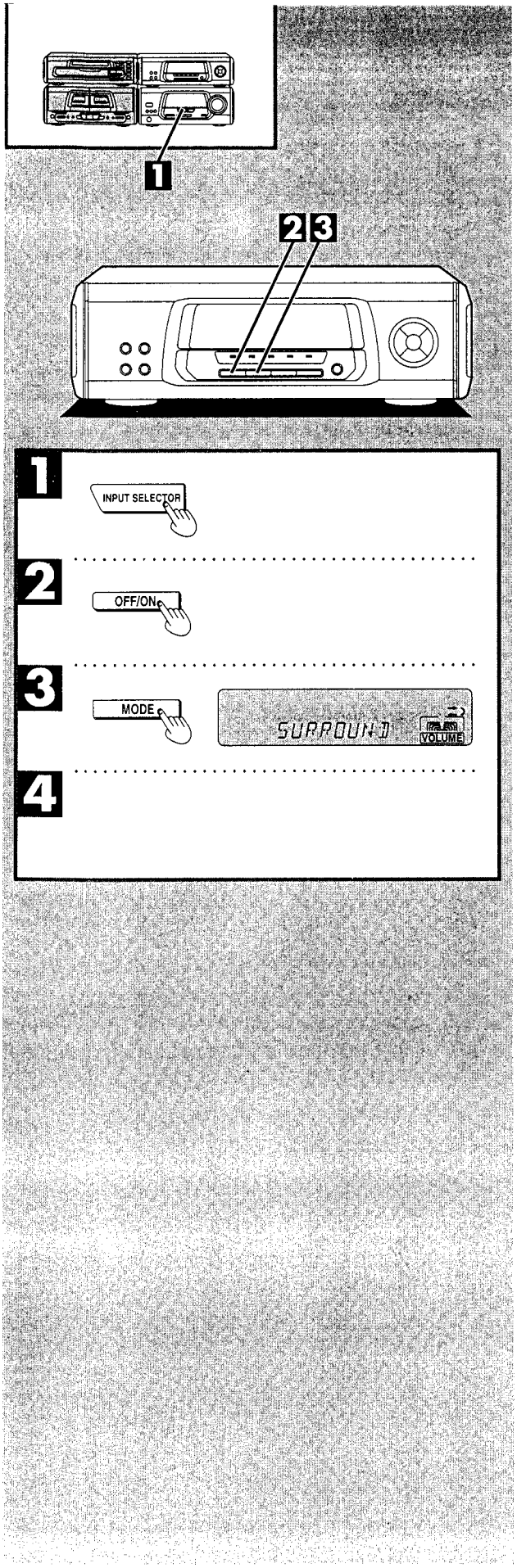
Output levels can be varied within a range of ±12 dB with front speaker output level serving as the zero point.

Notes

- The test signal is output only by the speaker you are now adjusting and does not repeat the sequence until adjustments are complete.
- Remember you cannot adjust the output level of the surround speakers if you selected the 3 STEREO mode in step 2.

To stop the test signal:

Press TEST.



Enjoying with SURROUND or 3 STEREO

Before trying anything, have you set the center mode and adjusted speaker output level?
When viewing a video, turn on the power supply for the TV and set the TV to video mode.

1 Press INPUT SELECTOR to select the desired external source.

Each time you press this button, sound sources will be switched as follows.

TUNER→CD→TAPE
↑ ↓
PHONO←VDP←VCR←EXT

These indications correspond to terminals on the rear panel of the sound processor or tuner/amplifier. Switch the displayed indication to the source you want to use.

2 Press DOLBY PRO LOGIC OFF/ON to select ON.

3 Press MODE to select "SURROUND" or "3 STEREO".

4 Start the desired source.

To operate external sources, refer to the operating instructions provided with the specific unit.

Note

When using SURROUND, use software recorded in Dolby Surround.

To turn off the DOLBY PRO LOGIC systems:

Press DOLBY PRO LOGIC OFF/ON to select "OFF".

Note

You cannot record acoustical effects produced in the SURROUND and 3 STEREO modes.

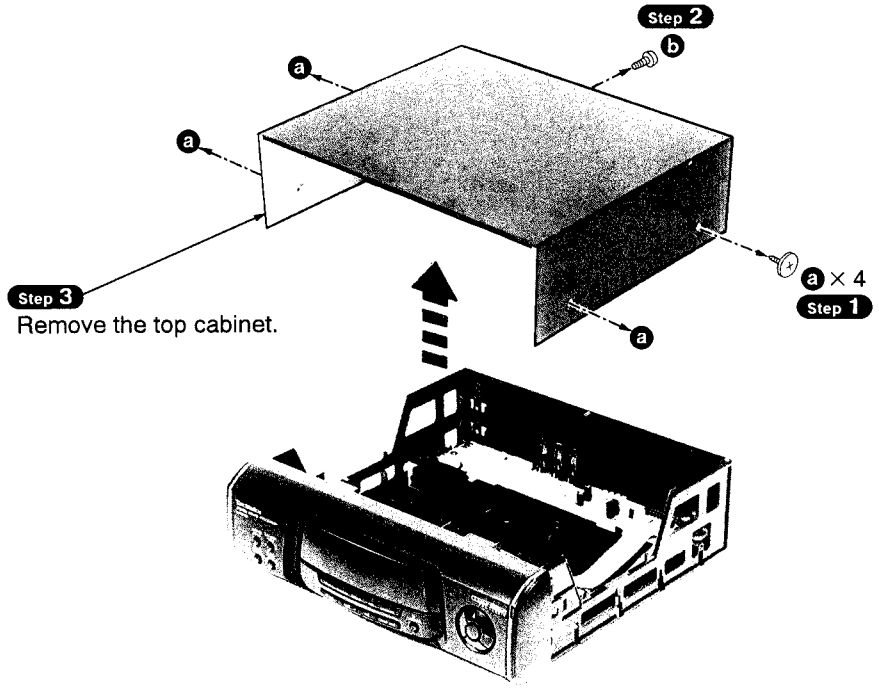
■ Operation Checks and Main Component Replacement Procedures

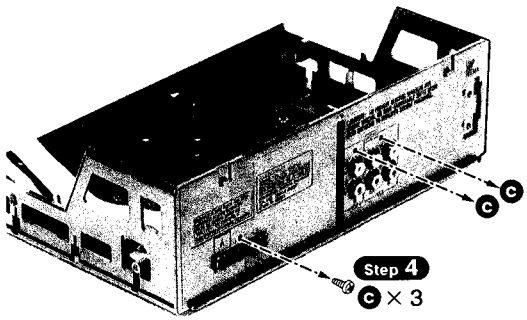
NOTE

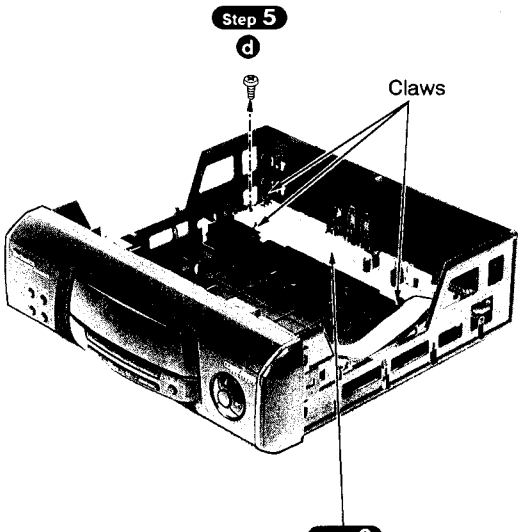
1. This section describes procedures for checking the operation of the major printed circuit boards and replacing the main components.

2. For reassembly after operation checks or replacement, reverse the respective procedures. Special reassembly procedures are described only when required.

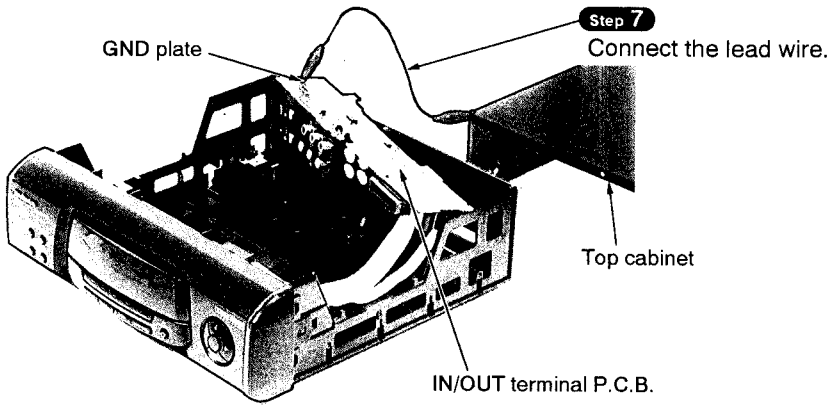
1. Checking for the IN/OUT terminal P.C.B.





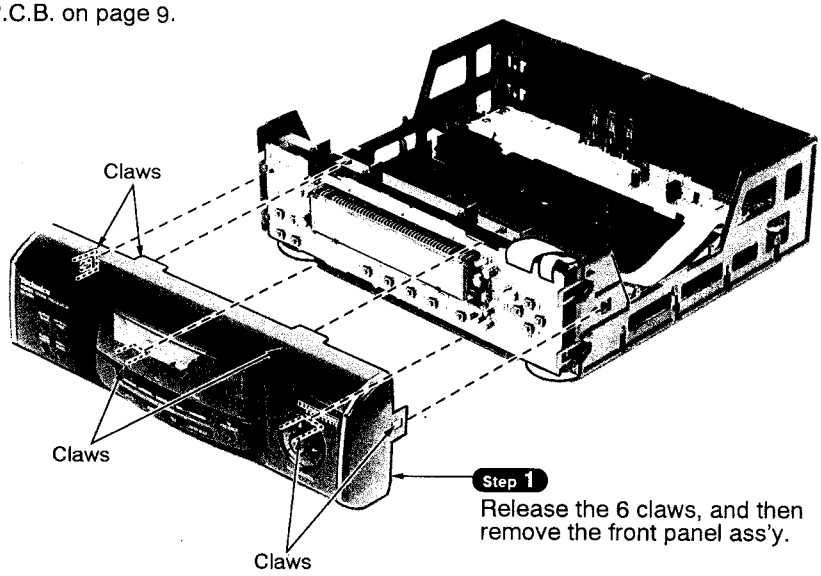


• Check the IN/OUT terminal P.C.B. as shown below.



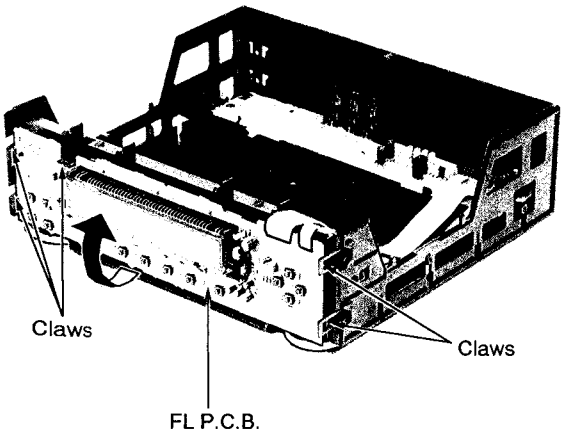
2. Checking for the FL P.C.B.

• Follow the Step 1 ~ Step 3 of the item 1 in checking procedure for each P.C.B. on page 9.

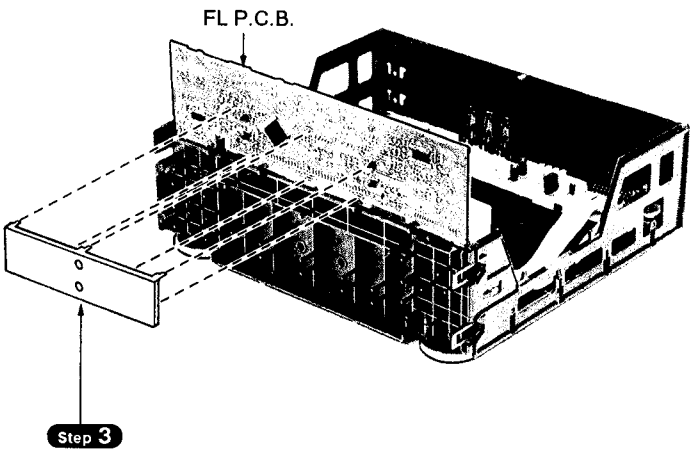


Step 1
Release the 6 claws, and then remove the front panel ass'y.

Step 2
Release the 5 claws, and then remove the FL P.C.B..



• Check the FL P.C.B. as shown below.



Step 3
Unsolder the shield plate terminals. (6 points)

■ To Supply Power Source

This unit SH-EH60 is designed to operate on power supplied from the Tuner/Amplifier SA-EH60. When operating the unit SH-EH60 alone for testing and servicing, without having power supplied from the Tuner/Amplifier SA-EH60, use the following method.

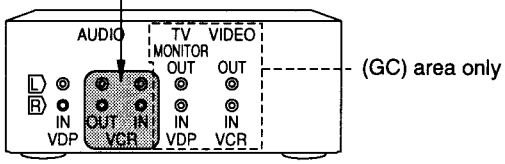
Power Supply to This Unit Alone

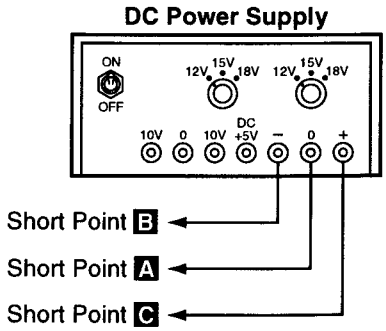
1. Short the section between **J124** and **D101**.
2. Short the section **J306, J307, J305** and **J302** with each other. (Point **A**)
3. Short the section between **J126** and **17 pin** of the connector **JK101**. (Point **B**)
4. Short the section between **J125** and **J101**. (Point **C**)
5. Apply +5 V DC power to the section between **J125** and **(+) foil side** of **C104**.
6. Connect the DC power supply as shown below.
   - +12 V terminal of the DC Power Supply connect to Point **C**.
   - GND terminal of the DC Power Supply connect to Point **A**.
   - −12 V terminal of the DC Power Supply connect to Point **B**.

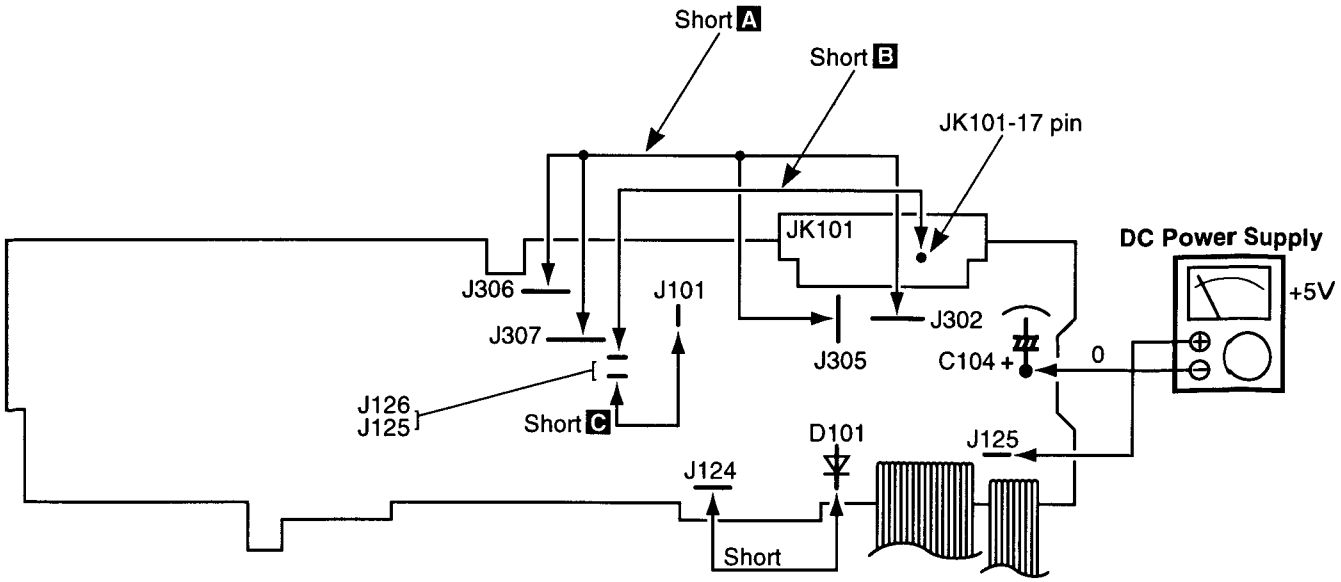
To Check Signal

1. Input the audio signal and confirm in to be outputted from the terminal.

	INPUT	OUTPUT
L-ch	AUDIO IN VCR	AUDIO OUT VCR
R-ch		







■Schematic Diagram

Page

A FL CIRCUIT 13, 14

B IN/OUT TERMINAL CIRCUIT 14

- This schematic diagram may be modified at any time with the development of new technology.

Notes:

- **S301**: EQ SPACE on/off switch (EQ SPACE ON/FLAT)
- **S302**: Acoustic image EQ switch (ACOUSTIC IMAGE EQ)
- **S303**: EQ SPACE preset/manual select switch (PRESET/MANUAL)
- **S304**: Display mode select/demonstration switch (DISP MODE/–DEMO)
- **S305**: DOLBY PRO LOGIC on/off switch (DOLBY PRO LOGIC, OFF/ON)
- **S306**: DOLBY PRO LOGIC mode select switch (MODE)
- **S307**: DOLBY PRO LOGIC test signal switch (TEST)
- **S308**: DOLBY PRO LOGIC center mode select switch (CENTER MODE)
- **S309**: 3D presence select switch (3D PRESENCE)
- **S310 ~ S313** : Multi control switch

  (MULTI CONTROL , S310 : ▼ , S311 : ◄ , S312 : ▲ , S313 : ►)

- Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.

- Voltage values and waveforms are measured as indicated in the schematic diagram when test points between **AG** and **VG** , and between **DG** and **CT-G** , and between **AG** and **DG** are shorted.

- Important safety notice:
  Components identified by ⚠ mark have special characteristics important for safety.
  Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used. When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.

- **Caution!**
  IC and LSI are sensitive to static electricity.
  Secondary trouble can be prevented by taking care during repair.
  Cover the parts boxes made of plastics with aluminum foil.
  Ground the soldering iron.
  Put a conductive mat on the work table.
  Do not touch the legs of IC or LSI with the fingers directly.

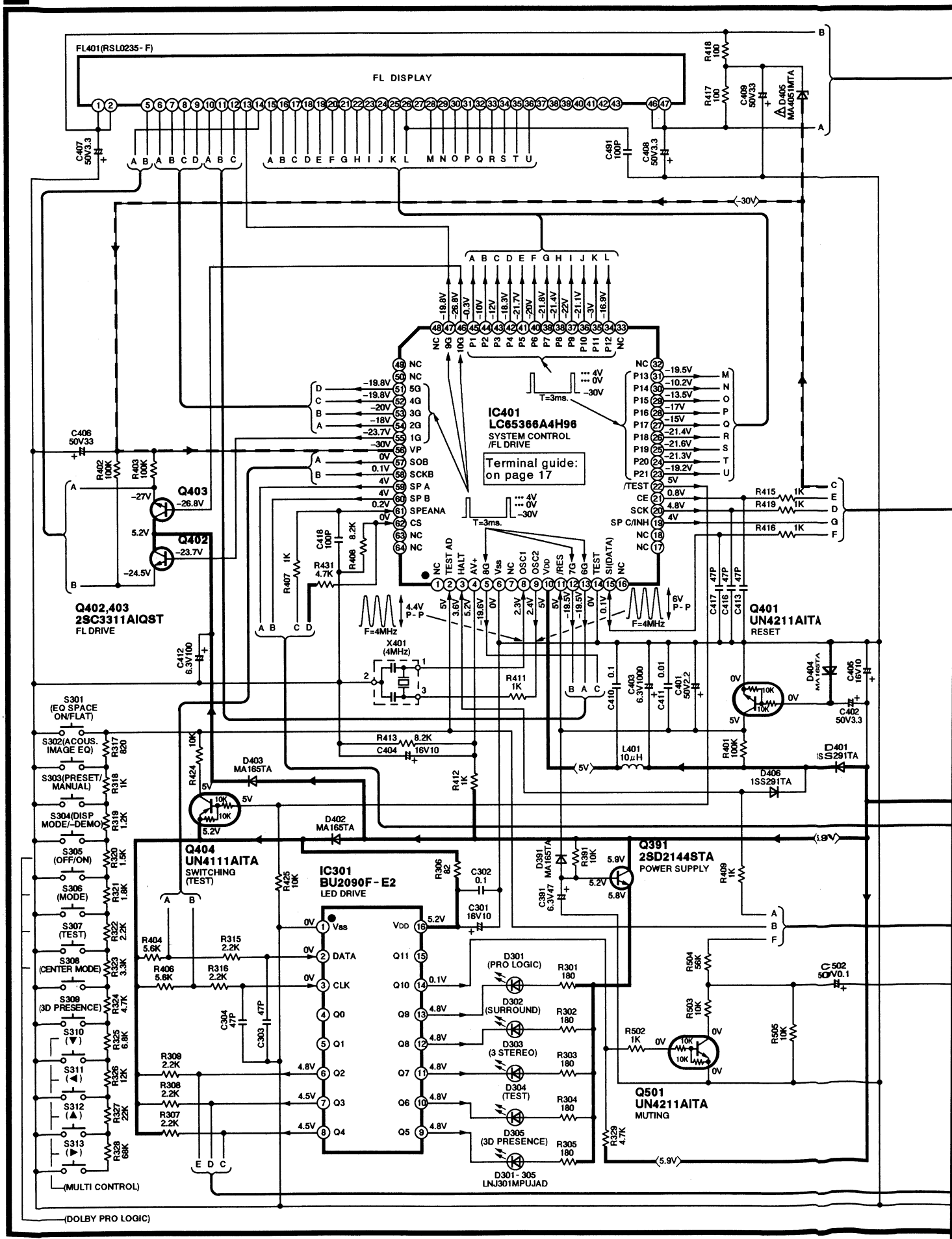
- **Voltage and signal line**

  ——►—— : Positive voltage line

  ▪▪▪▪►▪▪▪▪ : Negative voltage line

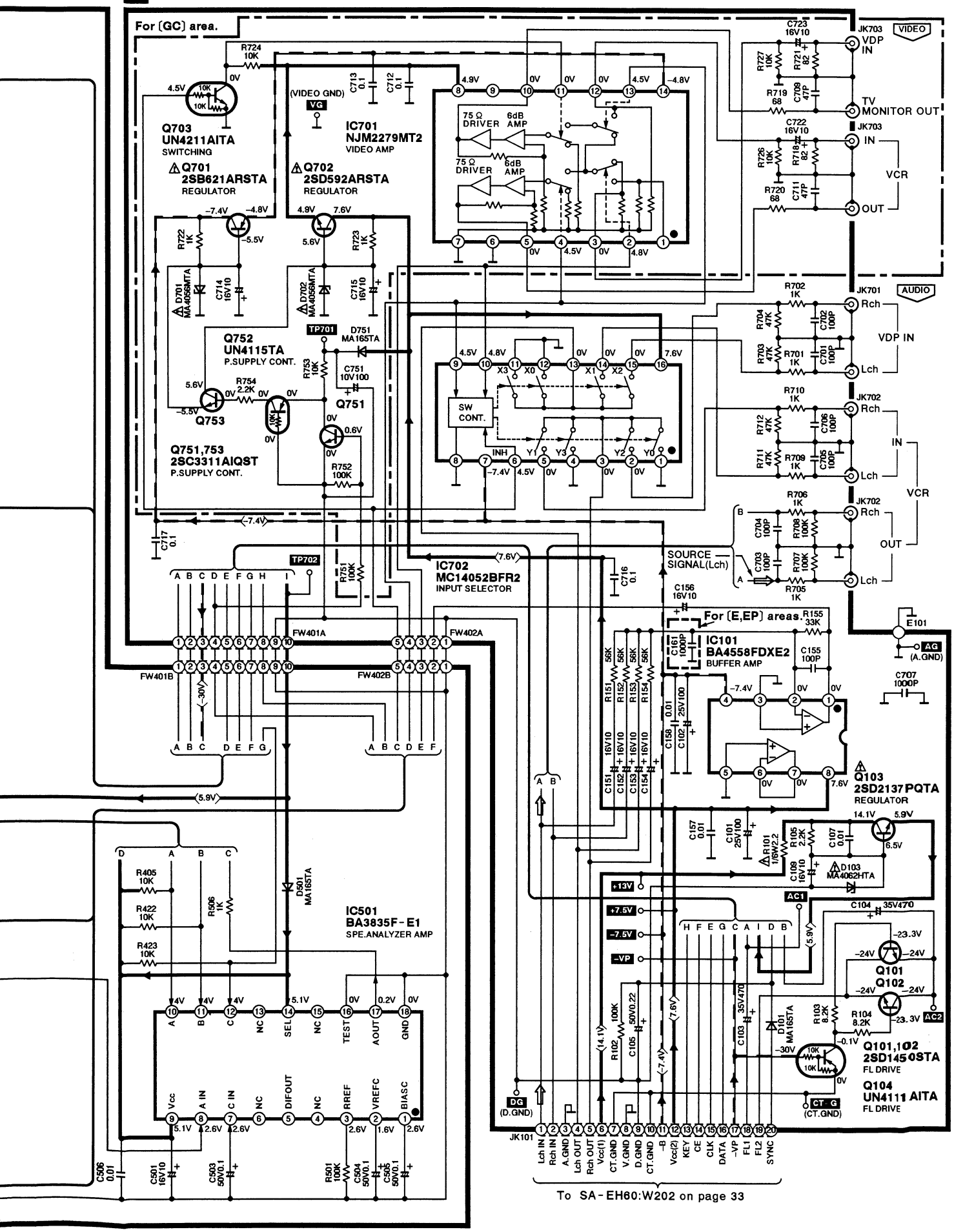
  ⇨ : Source signal line (L-ch)

A FL CIRCUIT (P.C.Board:on page 15)



: Positive voltage line : Negative voltage line : Source signal line (L-ch)

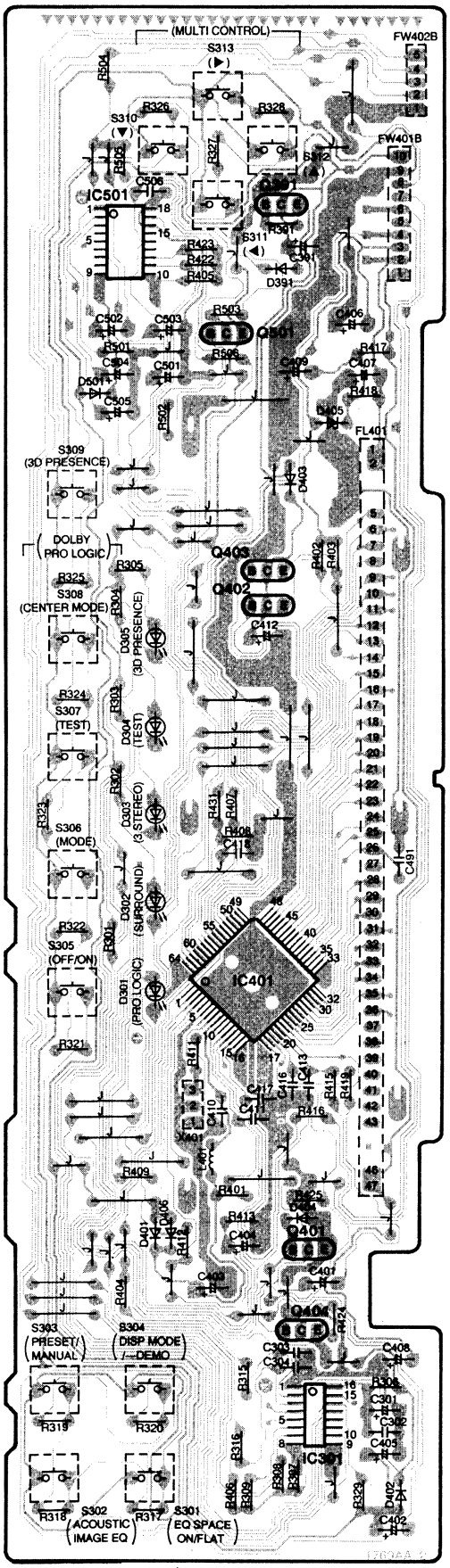
B IN/OUT TERMINAL CIRCUIT (P.C.Board:on page 15)



■ Printed Circuit Board Diagram

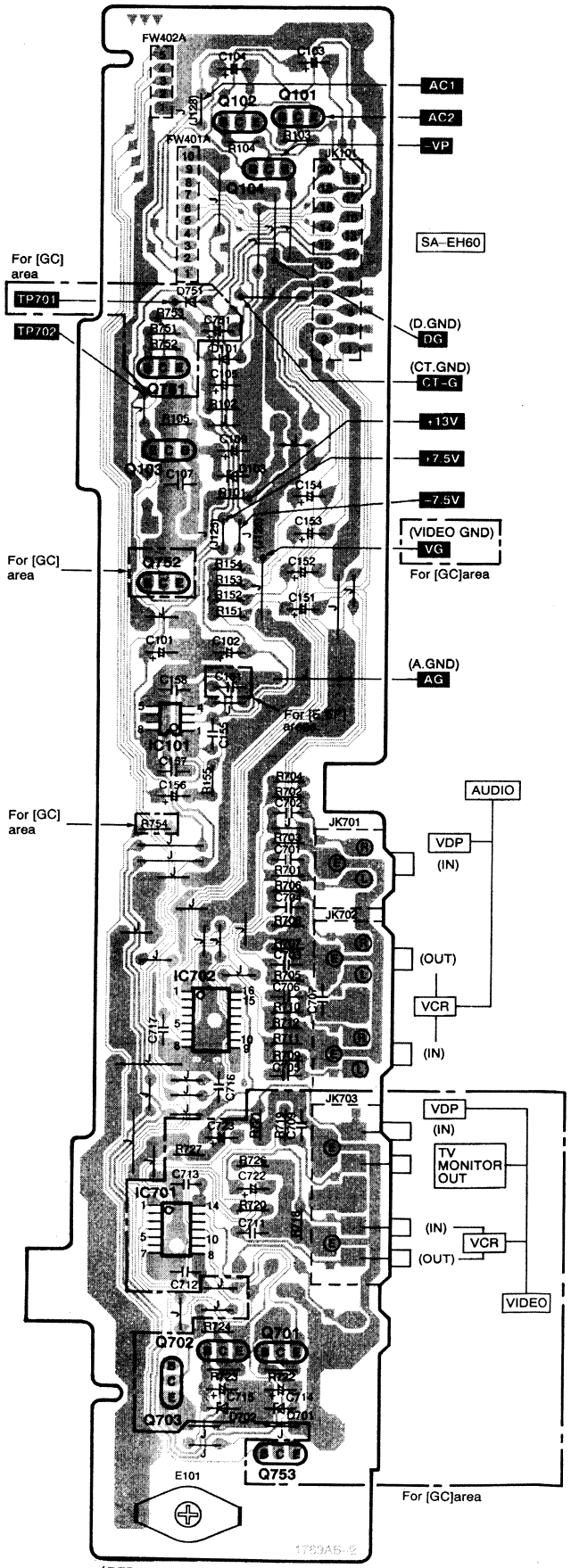
- This circuit board diagram may be modified at any time with the development of new technology.

A FL P.C.B.



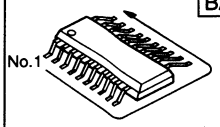
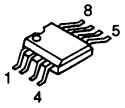
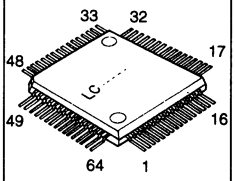
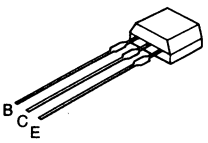
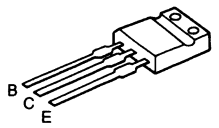
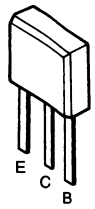
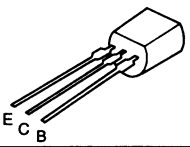
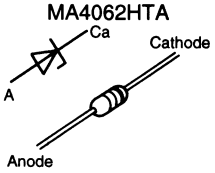
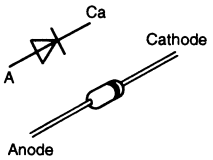
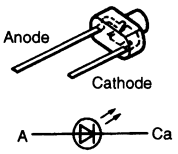
(REP2474B–M • • •[GC]
REP2474C–M • • •[E,EP])

B IN/OUT TERMINAL P.C.B.

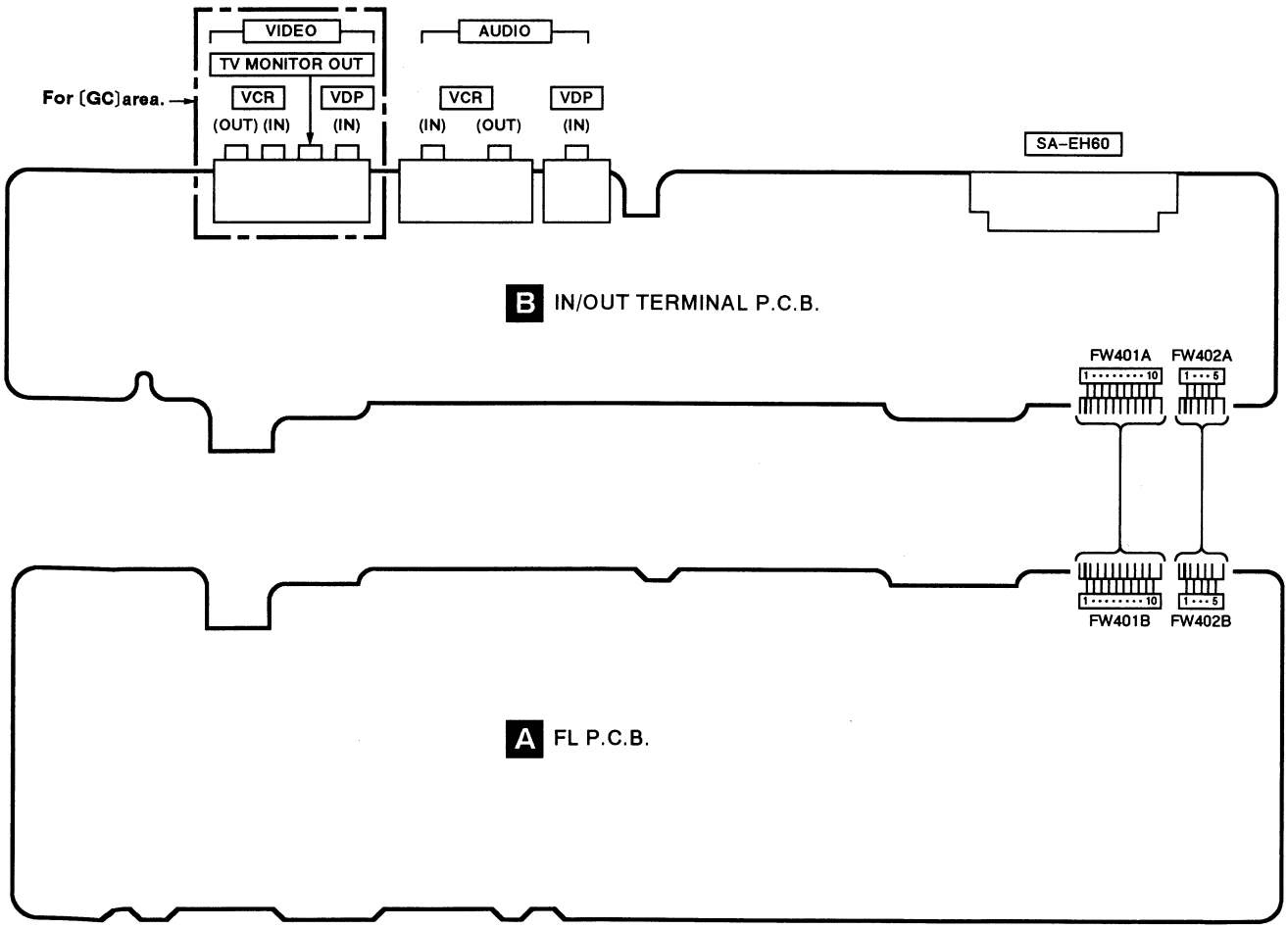


(REP2474B–M • • •[GC]
REP2474C–M • • •[E,EP])

■ Type Illustration of IC's, Transistors and Diodes

NJM2279MT2 14PIN BU2090F-E2 16PIN MC14052BFR2 16PIN BA3835F-E1 18PIN 	BA4558FDXE2 	LC65366A4H96 	2SD2144STA 	2SD2137PQTA 	
	2SC3311AIQST 2SD1450STA UN4111AITA UN4115TA UN4211AITA	2SB621ARSTA 2SD592ARSTA 	MA4051MTA MA4056MTA MA4062HTA 	1SS291TA MA165TA 	LNJ301MPUJAD 

■ Wiring Connection Diagram



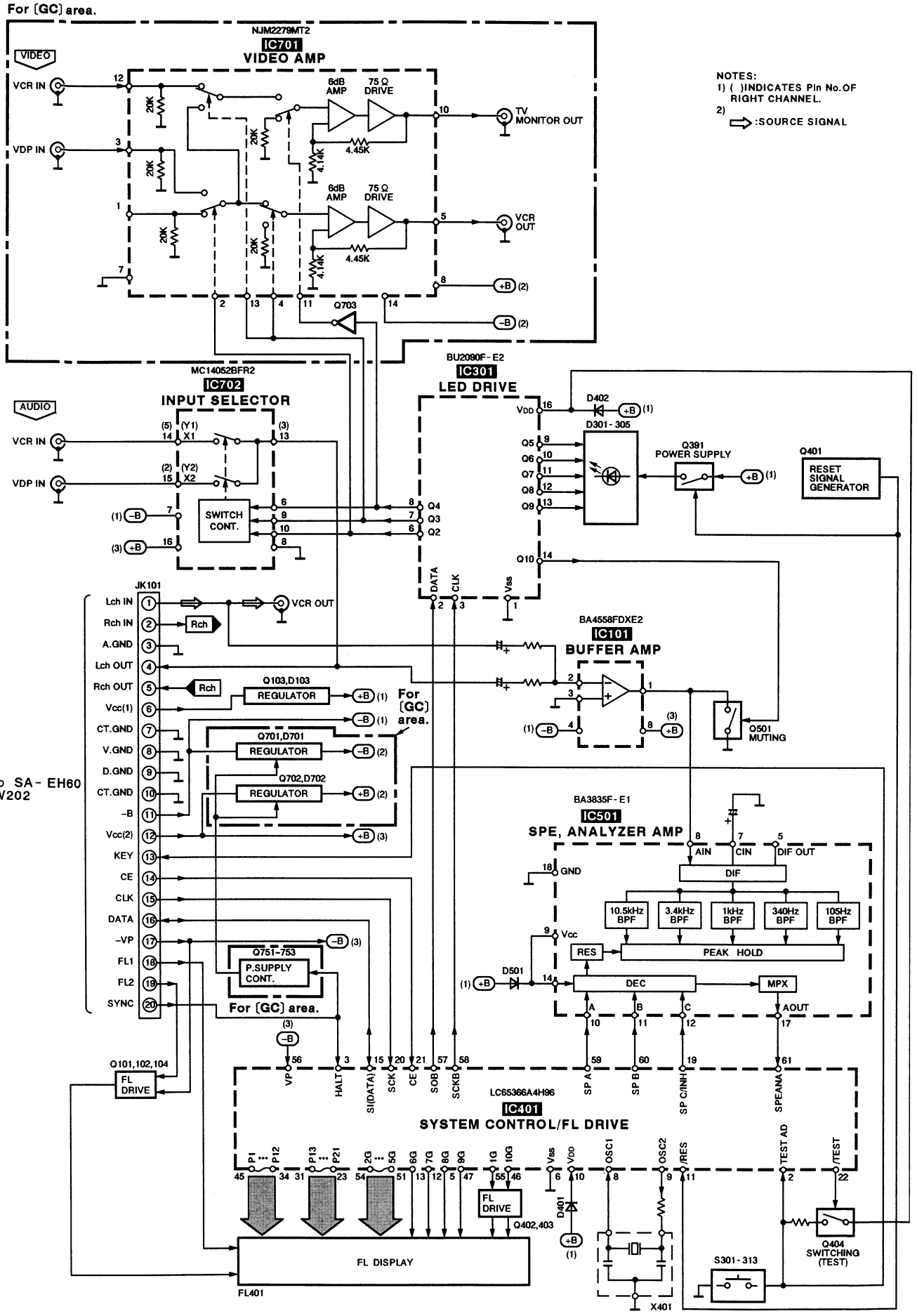
■ Terminal Function of IC's

• IC401 (LC65366A4H96) : System Control / FL Drive

Pin No.	Terminal Name	I/O	Function
1	NC	—	No used, open
2	TEST AD	I	TEST mode key signal input
3	HALT	I	Power failure detect signal input
4	AV+	—	Power supply for analog circuit (+5 V)
5	8G	O	Grid signal output
6	VSS	—	GND terminal
7	NC	—	No used, open
8	OSC1	I	Oscillator connected terminal (4 MHz)
9	OSC2	O	
10	VDD	—	Power supply
11	/RES	I	Reset signal input
12, 13	7G, 6G	O	Grid signal output
14	TEST	—	No used, conneted to VSS
15	SI	I/O	Communication data signal input from SA-EH60
16~18	NC	—	No used, open
19	SP C/INH	O	Select terminal for Spectrum analyzer IC output
20	SCK	O	Serial communication signal from SA-EH60 (Clock signal input)

Pin No.	Terminal Name	I/O	Function
21	CE	O	Serial communication signal from SA-EH60 (Chip enable signal input)
22	/TEST	O	Test signal terminal
23~31	P21~P13	O	Segment signal output
32, 33	NC	—	No used, open
34~45	P12~P1	O	Segment signal output
46, 47	10G, 9G	O	Grid signal output
48~50	NC	—	No used, open
51~55	5G~1G	O	Grid signal output
56	VP	—	Negative power supply
57	SOB	O	Serial data signal output
58	SCKB	O	Serial clock signal output
59	SP A	O	Select terminal for Spectrum analyzer IC output
60	SP B	O	
61	SPEANA	I	Analog signal input for spectrum analyzer IC
62	CS	I	Chip select signal input terminal
63, 64	NC	—	No used, open

■ Block Diagram



■ Replacement Parts List (Electrical)

Notes: *Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety.
Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used.
When replacing any of components, be sure to use only manufacture's specified parts shown in the parts list.
*The parenthesized indications in the Remarks columns specify the areas. (Refer to the cover page for area.)
Parts without these indications can be used for all areas.
*[M] Indicates in Remarks columns parts that are supplied by MESA.

Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)	
IC101	BA4558FDXE2	IC	[M]
IC301	BU2090F-E2	IC	[M]
IC401	LC65366A4H96	IC	[M]
IC501	BA3835F-E1	IC	[M]
IC701	NJM2279MT2	IC	[M] (GC)
IC702	MC14052BFR2	IC	[M]
		TRANSISTOR(S)	
Q101, 102	2SD1450RTA	TRANSISTOR	[M]
Q103⚠	2SD2137PQTA	TRANSISTOR	[M]
Q104	UN4111	TRANSISTOR	[M]
Q391	2SD2144S	TRANSISTOR	[M]
Q401	UN4211	TRANSISTOR	[M]
Q402, 403	2SC3311AIRTA	TRANSISTOR	[M]
Q404	UN4111	TRANSISTOR	[M]
Q501	UN4211	TRANSISTOR	[M]
Q701⚠	2SB621ARSTA	TRANSISTOR	[M] (GC)
Q702⚠	2SD592ARSTA	TRANSISTOR	[M] (GC)
Q703	UN4211	TRANSISTOR	[M] (GC)
Q751	2SC3311AIQST	TRANSISTOR	[M] (GC)
Q752	UN4115TA	TRANSISTOR	[M] (GC)
Q753	2SC3311AIQST	TRANSISTOR	[M] (GC)
		DIODE(S)	
D101	MA165	DIODE	[M]
D103⚠	MA4062-H	DIODE	[M]
D301-305	LNJ301MPUJAD	DIODE	[M]
D391	MA165	DIODE	[M]
D401	1SS291TA	DIODE	[M]
D402-404	MA165	DIODE	[M]
D405⚠	MA4051MTA	DIODE	[M]
D406	1SS291TA	DIODE	[M]
D501	MA165	DIODE	[M]
D701, 702⚠	MA4056MTA	DIODE	[M] (GC)
D751	MA165TA	DIODE	[M] (GC)
		COIL(S)	
L401	RLQA100JT-Y	COIL	[M]
		OSCILLATOR(S)	

Ref. No.	Part No.	Part Name & Description	Remarks
X401	EFOEC4004T4	OSCILLATOR	[M]
		DISPLAY TUBE	
FL401	RSL0235-F	DISPLAY TUBE	[M]
		SWITCH(ES)	
S301-313	EVQ21405R	SW	[M]
		EARTH TERMINAL(S)	
E101	SNE1004-2	EARTH TERMINAL	[M]
		JACK(S)	
JK101	RJT065K20	SYSTEM	[M]
JK701	SJF3068-7N	VDP IN	[M]
JK702	SJF3069N	VCR IN/OUT	[M]
JK703	SJF3069-3N	VDP/VCR IN/OUT	[M] (GC)

■ Resistors and Capacitors

Notes : * Capacity values are in microfarads (uF) unless specified otherwise, P=Pico-farads(pF) F=Farads(F)
* Resistance values are in ohms, unless specified otherwise, 1K=1,000(OHM) , 1M=1,000k(OHM)

Ref. No.	Part No.	Values & Remarks
		RESISTORS
R101⚠	ERQ16NKW2R2E	1/6W 2.2 [M]
R102	ERDS2TJ104	1/4W 100K [M]
R103, 104	ERDS2TJ822	1/4W 8.2K [M]
R105	ERDS2TJ222	1/4W 2.2K [M]
R151-154	ERDS2TJ563	1/4W 56K [M]
R155	ERDS2TJ333	1/4W 33K [M]
R301-305	ERDS2TJ181T	1/4W 180 [M]
R306	ERDS2TJ820	1/4W 82 [M]
R307-309	ERDS2TJ222	1/4W 2.2K [M]
R315, 316	ERDS2TJ222	1/4W 2.2K [M]
R317	ERDS2TJ821	1/4W 820 [M]
R318	ERDS2TJ102	1/4W 1K [M]
R319	ERDS2TJ122	1/4W 1.2K [M]
R320	ERDS2TJ152	1/4W 1.5K [M]
R321	ERDS2TJ182	1/4W 1.8K [M]
R322	ERDS2TJ222	1/4W 2.2K [M]
R323	ERDS2TJ332	1/4W 3.3K [M]
R324	ERDS2TJ472	1/4W 4.7K [M]
R325	ERDS2TJ682T	1/4W 6.8K [M]
R326	ERDS2TJ123	1/4W 12K [M]
R327	ERDS2TJ223	1/4W 22K [M]
R328	ERDS2TJ683	1/4W 68K [M]
R329	ERDS2TJ472	1/4W 4.7K [M]
R391	ERDS2TJ103	1/4W 10K [M]
R401-403	ERDS2TJ104	1/4W 100K [M]
R404	ERDS2TJ562	1/4W 5.6K [M]
R405	ERDS2TJ103	1/4W 10K [M]
R406	ERDS2TJ562	1/4W 5.6K [M]
R407	ERDS2TJ102	1/4W 1K [M]
R408	ERDS2TJ822	1/4W 8.2K [M]
R409	ERDS2TJ102	1/4W 1K [M]
R411, 412	ERDS2TJ102	1/4W 1K [M]
R413	ERDS2TJ822	1/4W 8.2K [M]
R415, 416	ERDS2TJ102	1/4W 1K [M]
R417, 418	ERDS2TJ101	1/4W 100 [M]
R419	ERDS2TJ102	1/4W 1K [M]
R422-425	ERDS2TJ103	1/4W 10K [M]
R431	ERDS2TJ472	1/4W 4.7K [M]
R501	ERDS2TJ104	1/4W 100K [M]
R502	ERDS2TJ102	1/4W 1K [M]
R503	ERDS2TJ103	1/4W 10K [M]
R504	ERDS2TJ563	1/4W 56K [M]
R505	ERDS2TJ103	1/4W 10K [M]
R506	ERDS2TJ102	1/4W 1K [M]
R701, 702	ERDS2TJ102	1/4W 1K [M]
R703, 704	ERDS2TJ473	1/4W 47K [M]
R705, 706	ERDS2TJ102	1/4W 1K [M]
R707, 708	ERDS2TJ104	1/4W 100K [M]
R709, 710	ERDS2TJ102	1/4W 1K [M]
R711, 712	ERDS2TJ473	1/4W 47K [M]
R718	ERDS2TJ820T	1/4W 82 [M] (GC)
R719, 720	ERDS2TJ680T	1/4W 68 [M] (GC)
R721	ERDS2TJ820T	1/4W 82 [M] (GC)
R722, 723	ERDS2TJ102T	1/4W 1K [M] (GC)
R724	ERDS2TJ103T	1/4W 10K [M] (GC)
R726, 727	ERDS2TJ103T	1/4W 10K [M] (GC)
R751, 752	ERDS2TJ104T	1/4W 100K [M] (GC)
R753	ERDS2TJ103T	1/4W 10K [M] (GC)
R754	ERDS2TJ222T	1/4W 2.2K [M] (GC)
		CAPACITORS
C101, 102	ECA1EM101B	25V 100U [M]
C103, 104	RCE1VM471BV	35V 470U [M]
C105	ECEA1HKAR22B	50V 0.22U [M]
C107	ECBT1E103ZF	25V 0.01U [M]
C109	RCE1CKA100BG	16V 10U [M]
C151-154	RCE1CKA100BG	16V 10U [M]
C155	ECBT1H101KB5	50V 100P [M]
C156	RCE1CKA100BG	16V 10U [M]
C157, 158	ECBT1E103ZF	25V 0.01U [M]
C161	ECBT1H102KB5	50V 1000P [M] (E, EP)
C301	RCE1CKA100BG	16V 10U [M]
C302	ECBT1H104ZF5	50V 0.1U [M]
C303, 304	ECBT1H470J5	50V 47P [M]
C391	RCE0JKA470BG	6.3V 47U [M]
C401	ECEA1HKA2R2B	50V 2.2U [M]
C402	RCE1HKA3R3BG	50V 3.3U [M]
C403	RCE0JU102BV	6.3V 1000U [M]
C404, 405	RCE1CKA100BG	16V 10U [M]
C406	ECEA1HKA330B	50V 33U [M]
C407, 408	RCE1HKA3R3BG	50V 3.3U [M]
C409	ECEA1HKA330B	50V 33U [M]
C410	ECBT1H104ZF5	50V 0.1U [M]
C411	ECBT1E103ZF	25V 0.01U [M]
C412	ECEA0JKS101B	6.3V 100U [M]
C413	ECBT1H470J5	50V 47P [M]
C416, 417	ECBT1H470J5	50V 47P [M]
C418	ECBT1H101KB5	50V 100P [M]
C491	ECBT1H101KB5	50V 100P [M]
C501	RCE1CKA100BG	16V 10U [M]
C502-505	ECEA1HKA0R1B	50V 0.1U [M]
C506	ECBT1E103ZF	25V 0.01U [M]
C701-706	ECBT1H101KB5	50V 100P [M]
C707	ECBT1H102KB5	50V 1000P [M]
C709, 711	ECBT1H470J5	50V 47P [M] (GC)
C712, 713	ECBT1H104ZF5	50V 0.1U [M] (GC)
C714, 715	RCE1CKA100BG	16V 10U [M] (GC)
C716, 717	ECBT1H104ZF5	50V 0.1U [M]
C722, 723	RCE1CKA100BG	16V 10U [M] (GC)
C751	RCE1AKA101BG	10V 100U [M] (GC)

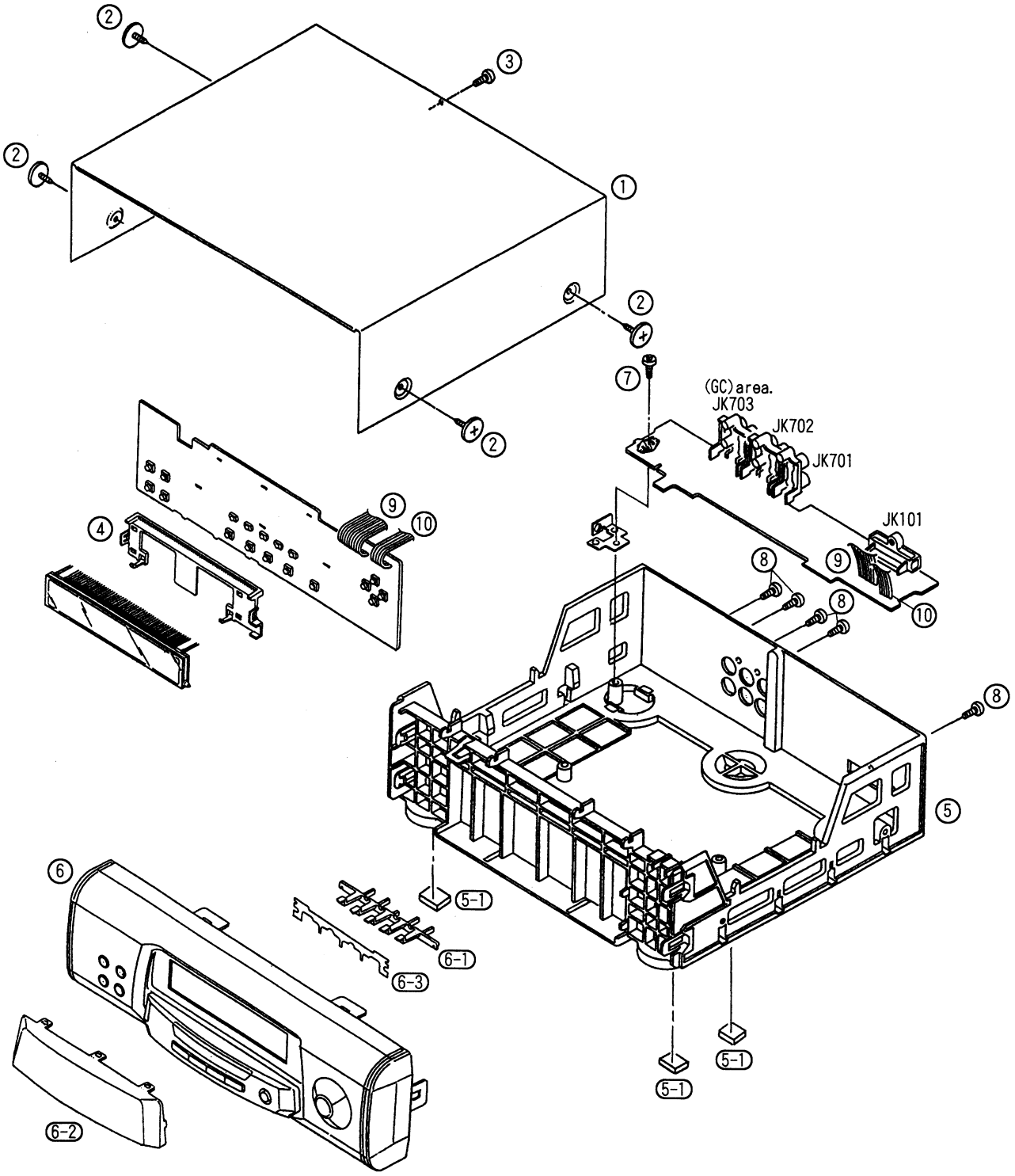
■ Replacement Parts List (Cabinet)

Notes: *The parenthesized indications in the Remarks columns specify the areas. (Refer to the cover page for area.)
Parts without these indications can be used for all areas.
*[M] Indicates in Remarks columns parts that are supplied by MESA.

Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET PARTS	
1	RKMD302-K	CABINET	[M]
2	RHD30007-K1	SCREW	[M]
3	XTB3+8JFZ	SCREW	[M]
4	RMN0424	FL HOLDER	[M]
5	RYK0700B-K	BOTTOM CABINET ASS'Y	[M] (E, EP)
5	RYK0700D-K	BOTTOM CABINET ASS'Y	[M] (GC)
5-1	SHG1654	RUBBER	[M]
6	RYP0733D-K	FRONT PANEL ASS'Y	[M]
6-1	RGL0358-Q	LENS	[M]
6-2	RKW0504-V	FL PANEL	[M]
6-3	RMZ0423	SHEET	[M]
7	XTBS3+8JFZ1	SCREW	[M]
8	XTB3+8JFZ	SCREW	[M]
9	RWJ5710240KK	FLAT CABLE(FW401/10P)	[M]
10	RWJ5705240KK	FLAT CABLE(FW402/5P)	[M]

Ref. No.	Part No.	Part Name & Description	Remarks

■ Cabinet Parts Location



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ORDER NO. PAES 970210C6

Service Manual

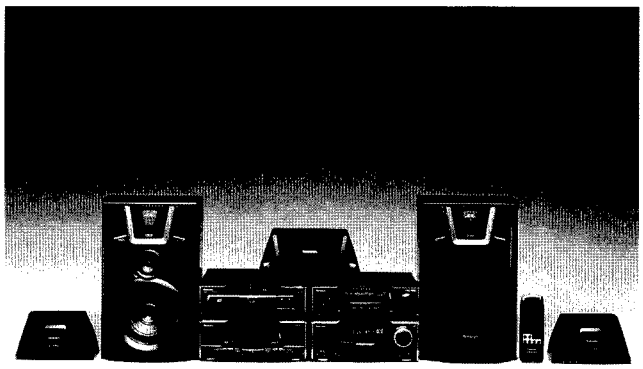
Speaker System

SB-EH60

Colour

(K) . . . . . Black Type

Hi-Fi Speaker System



■ SPECIFICATIONS

Type	3 way, 3 speaker system
Speaker	Woofer: 14 cm cone type Mid range: 6cm cone type Tweeter: 6 cm cone type
Impedance	6 Ω
Input power	160 W (MUSIC) 80,(DIN)
Output sound pressure level	85dB/W (1.0 m)
Cross over frequency	3KHz,8KHz
Frequency range	42Hz - 22kHz (-16 dB) 46Hz - 20kHz (-10 dB)
Dimensions (W x H x D)	254 x 412x 267 mm
Weight	5,1 kg

Notes:
Specifications are subject to change without notice.
Weight and dimensions are approximate.

■ ESPECIFICACIONES

Tipo	Sistema con 3 vias, 3 altavoces
Altavoces	Graves: 14 cm tipo cónico Medios: 6 cm tipo cónico Agudos: 6 cm tipo cónico
Impedancia	6 Ω
Capacidad de potencia	160 W (Músicales) 80,(DIN)
Nivel de presión acústica de salida	85dB/W (1.0 m)
Frecuencia de cruce	3KHz,8KHz
Respuesta de frecuencias	42Hz - 22kHz (-16 dB) 46Hz - 20kHz (-10 dB)
Dimensiones (W x H x D)	254 x 412 x 267 m
Peso	5,1 kg

Nota:
Estas especificaciones están sujetas a cualquier cambio.
Peso y dimensiones son aproximados.

■ SPECIFICATIONS

Type	3-voies, 3-haut-parleurs
Haut-parleurs	Graves: 14 cm type a cone Moyennes: 6 cm type a cone Aguis: 6 cm type a cone
Impédance	6 Ω
Entrée maximale	160 W (Musique) 80,(DIN)
Niveau de pression sonore de sortie	85dB/W (1.0 m)
Fréquence de conmutation	3KHz,8KHz
Gamme de fréquences	42Hz - 22kHz (-16 dB) 46Hz - 20kHz (-10 dB)
Dimensions (W x H x D)	254 x 412 x 267 mm
Poids	5,1 kg

Notes:
Suject à changement sans preavis.
Poids et dimensions sont aproximatifs.

⚠ WARNING

This service information is designed for experiense repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

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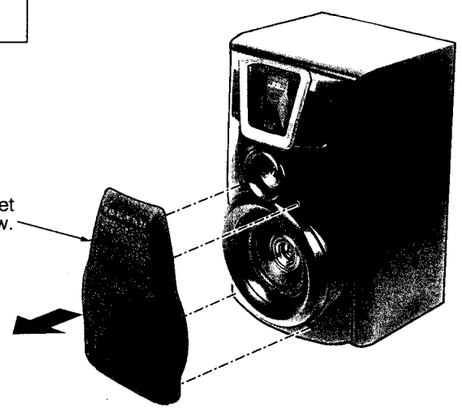
■ DISASSEMBLY INSTRUCTIONS

Ref.No. 1	Removal of the speaker net
Procedure 1	

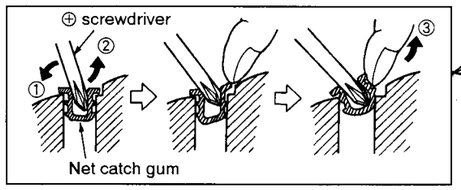
• Remove the speaker net in the direction of arrow.

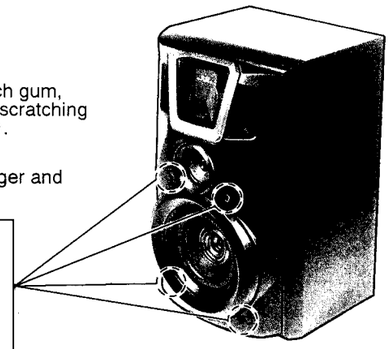


Ref.No. 2	Removal of the front panel ass'y
Procedure 1 ➡ 2	

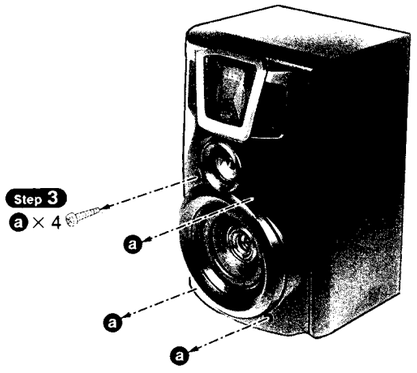
Step 1
Insert the ⊕ screwdriver or similar tool into net catch gum, push in slightly in the direction of arrow ① to avoid scratching the cabinet ass'y and lift in the direction of arrow ②.

Step 2
After lifting the net catch gum, grasp it with your finger and remove in the direction of arrow ③.

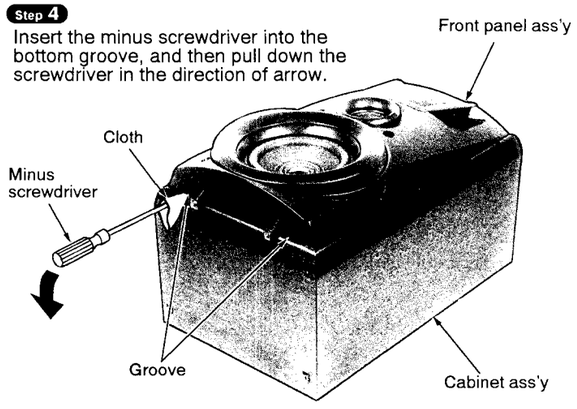




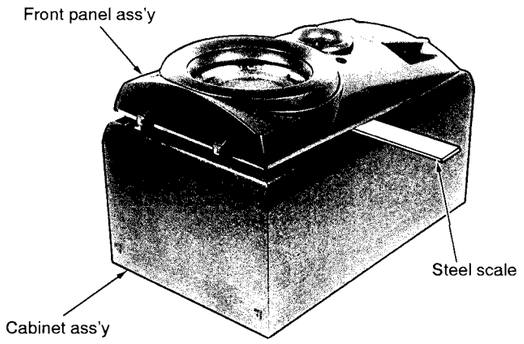
Step 3
ⓐ × 4



Step 4
Insert the minus screwdriver into the bottom groove, and then pull down the screwdriver in the direction of arrow.



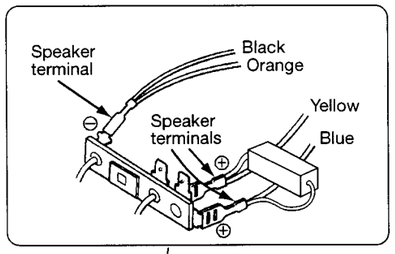
NOTE
To avoid the damage to the cabinet ass'y or front panel ass'y, cover to the minus screwdriver with cloth.

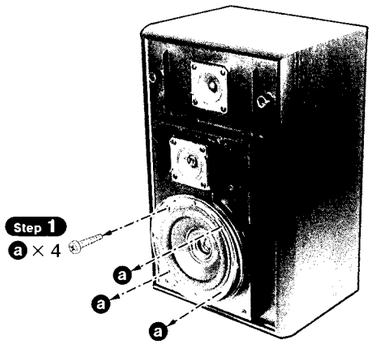


Step 5
Insert the steel scale to the clearance between the front panel ass'y and cabinet ass'y and spread the clearance to the upper little by little.
Remove the front panel ass'y after the clearance is widen fully.

Ref.No. 3	Removal of the speaker (Woofer)
Procedure 1 ➡ 2 ➡ 3	

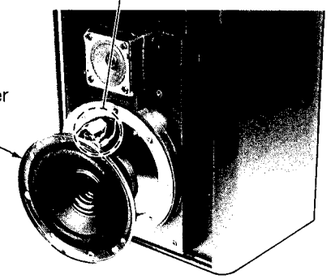
Step 3
Remove the speaker terminals.





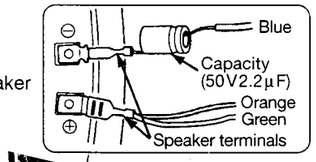
Step 1
ⓐ × 4

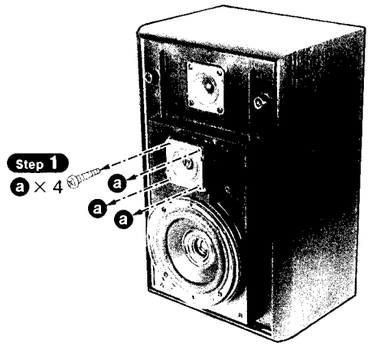
Step 2
Pull out the speaker (Woofer).



Ref.No. 4	Removal of the speaker (Midrange)
Procedure 1 ➡ 2 ➡ 4	

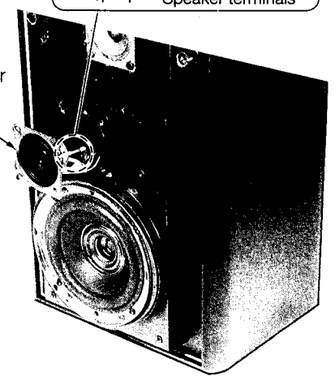
Step 3
Remove the speaker terminals.

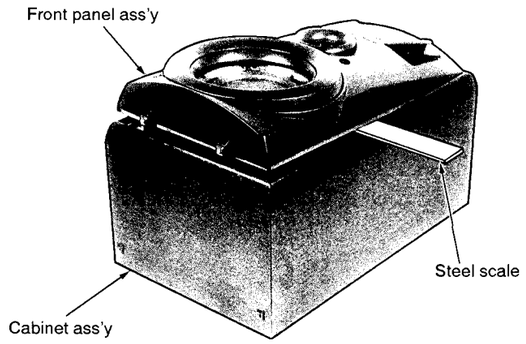




Step 1
ⓐ × 4

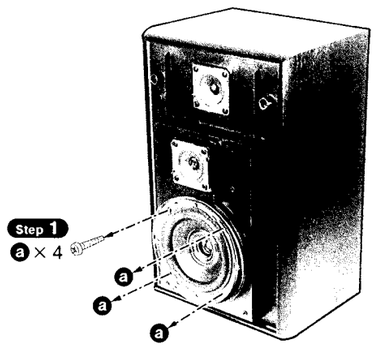
Step 2
Pull out the speaker (Midrange).



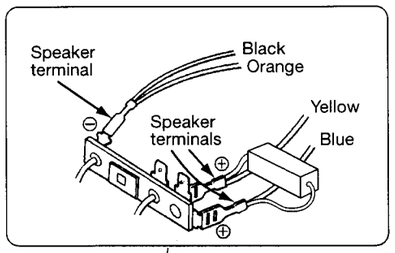


Step 5
Insert the steel scale to the clearance between the front panel ass'y and cabinet ass'y and spread the clearance to the upper little by little.
Remove the front panel ass'y after the clearance is widen fully.

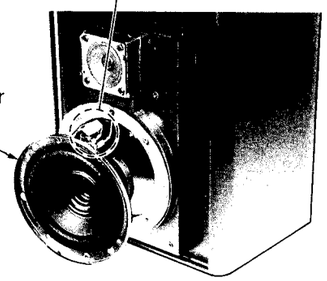
Ref.No. 3	Removal of the speaker (Woofer)
Procedure 1 ➡ 2 ➡ 3	



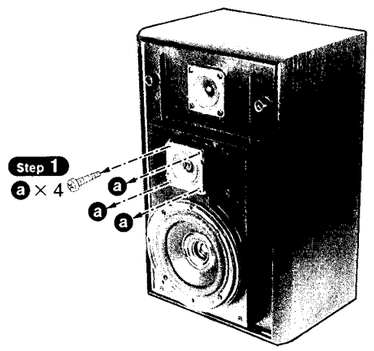
Step 3
Remove the speaker terminals.



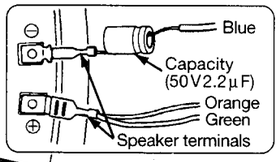
Step 2
Pull out the speaker (Woofer).



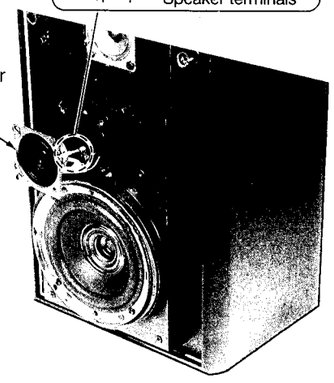
Ref.No. 4	Removal of the speaker (Midrange)
Procedure 1 ➡ 2 ➡ 4	



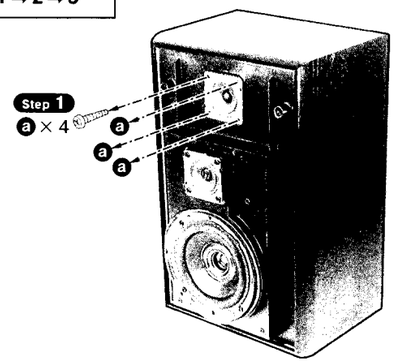
Step 3
Remove the speaker terminals.



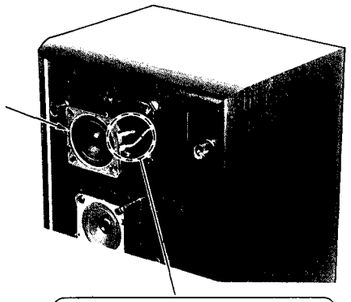
Step 2
Pull out the speaker (Midrange).



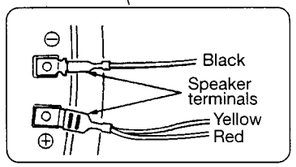
Ref.No. 5	Removal of the speaker (Tweeter)
Procedure 1 ➡ 2 ➡ 5	



Step 2
Pull out the speaker (Tweeter).

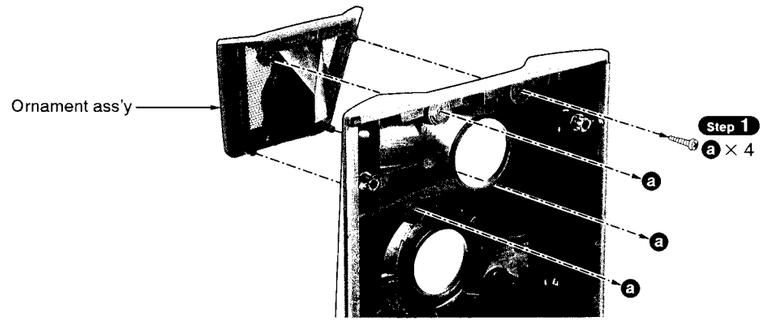


Step 3
Remove the speaker terminals.

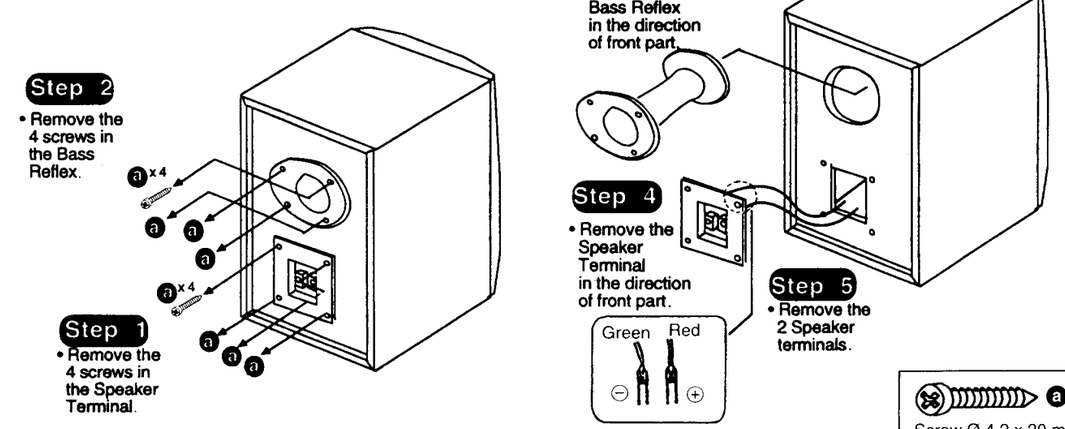


Ref.No. 6	Removal of the ornament ass'y
Procedure 1 ➡ 2 ➡ 6	

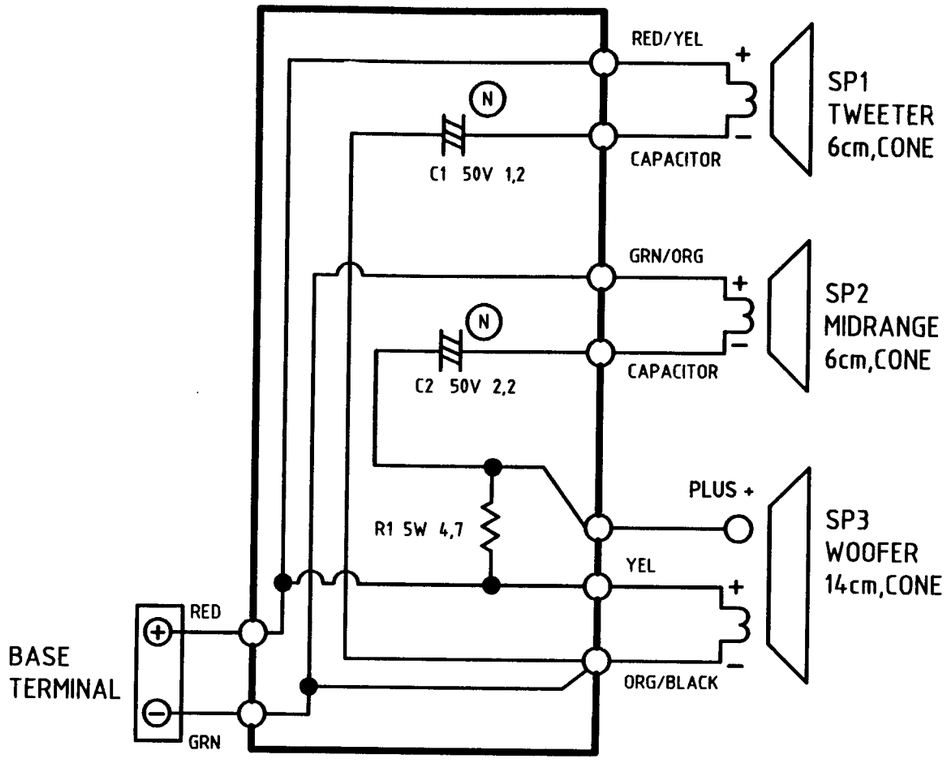
Step 2
Remove the ornament ass'y.



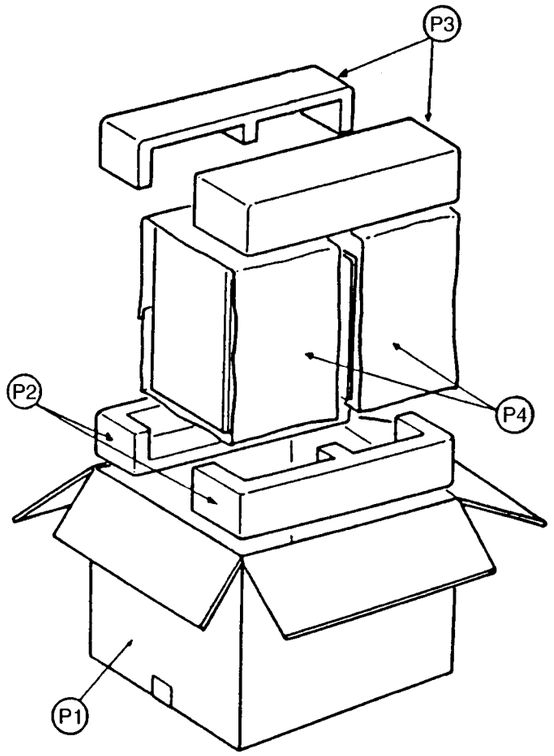
Ref. No. 7	Removal of the Speaker Terminal and
Procedure 7	Bass Reflex


Step 2
• Remove the 4 screws in the Bass Reflex.
ⓐ x 4
ⓐ x 4
Step 1
• Remove the 4 screws in the Speaker Terminal.
Step 3
• Remove the Bass Reflex in the direction of front part.
Step 4
• Remove the Speaker Terminal in the direction of front part.
Green
Red
Step 5
• Remove the 2 Speaker terminals.
ⓐ
Screw Ø 4.2 x 20 mm

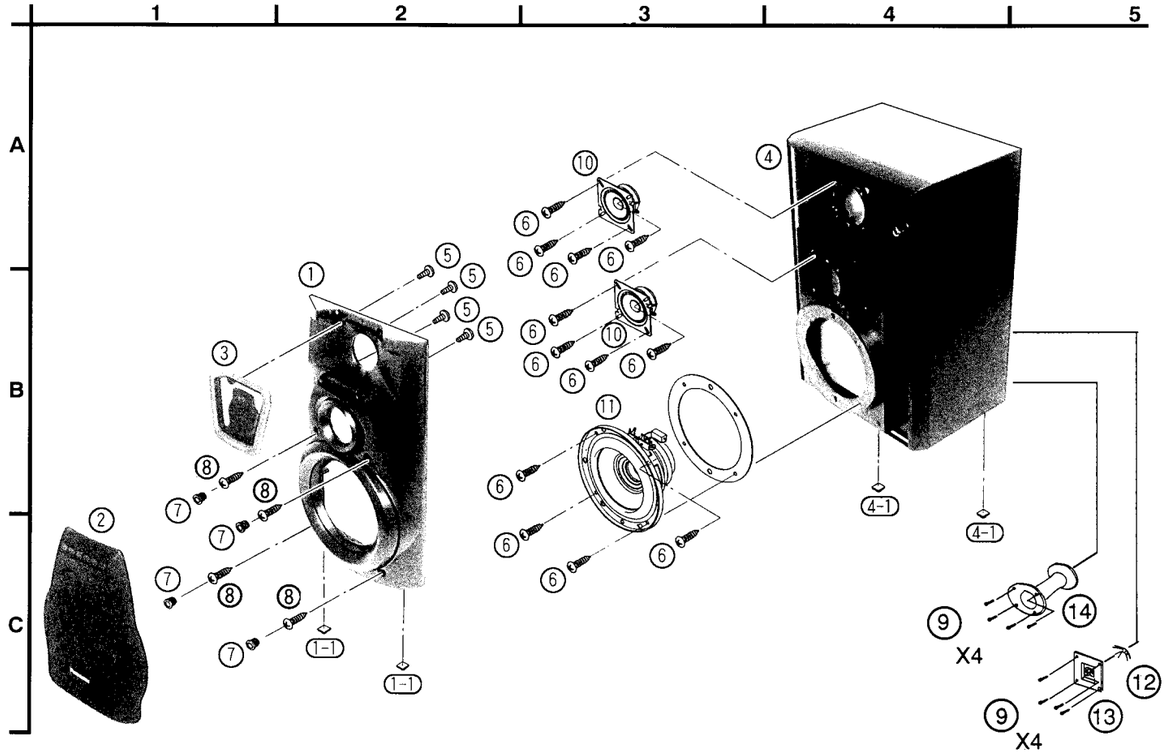
■ Schematic Diagram



■ Packaging



■ Cabinet Parts Location



■ Replacement Parts List

Notes 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. PAES indicates parts that are suplied by PAES.

Nota 1. El código está indicado en la mayoria de las piezas. Por favor use este codigo para sus pedidos.
2. La indicación PAES significa recambios suministrados a través de PAES.

Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET AND CHASSIS	
1	RGP0592-K	FRONT PANEL	PAES
1-1	RKA0072-K	LEGS	PAES
2	SYBPEH60	NET FRAME	PAES
3	RYQ0189-S	ORNAMENT	PAES
4	SYMPEH60	CABINET ASS,Y	PAES
4-1	RKA0072-K	LEGS	PAES
5	XTV32+11J	SCREW ORNAMMENT	PAES
6	XTN42+16	SCREW TW /MID/WF	PAES
7	SHG8G9044	NET HOLDER	PAES
8	XTNP42+20	SCREW FOR F.PANEL	PAES
9	XTNP42+20FG	SCREW B.REF/B.TERM.	PAES
		SPEAKERS	
10	EAS6PH322A6	TWEETER/MIDRANGE	PAES

Ref. No.	Part No.	Part Name & Description	Remarks
11	EAST14PL02A6	WOOFER	PAES
12	REXPEH60	CAPAC./RESIS. ASS'Y	PAES
13	SJHP93-4	BASE TERMINAL	PAES
14	RKTP0029-K	BASS REFLEX	PAES
		RESISTORS / CAPACITORS	
R1	ERF5AK4R7	RESISTOR 5W 4,7Ω	PAES
C1	ECEA50Y2R2IK	CAPACITOR 2,2μF	PAES
C2	ECEA50Y1R2IK	CAPACITOR 1,2μF	PAES
		PACKING PARTS	
P1	SPGPEH60	CARTON BOX	PAES
P2	SPSPEH60AB	PAD DOWN	PAES
P3	SPSPEH60CD	PAD UP	PAES
P4	SPH8G415	SHEET	PAES

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